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DEVELOPMENT AND EVALUATION OF HERBAL FACE CREAM FOR TREATMENT OF ACNE PREPARED FROM THE LEAVES OF FICUS RELIGIOSA

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ABSTRACT

Ficus religiosa Linn is a large evergreen tree found throughout India, wild as well as cultivated. It is popular indigenous system of medicine like Ayurveda, Siddha, Unani and Homeopathy. In traditional system of medicine, various parts such as stem bark, root bark aerial roots, vegetative buds, leaves, fruits and latex are used in diabetes, vomiting, burns, gynaecological problems, dysentery, diarrhea, nervous disorders, tonic and astringent. Phytochemical investigation of plant barks, showed the presence tannins, saponins, flavonoids, steroids, terpenoids and cardiac glycosides.

The growing demand for natural and skin-friendly cosmetic products has encouraged extensive research into herbal formulations with both cosmetic and therapeutic benefits. Herbal face creams, in particular, have gained prominence as they offer moisturization, protection, and nourishment while minimizing the adverse effects often associated with synthetic preparations. In this context, *Ficus religiosa* leaves were selected for the development of a herbal face cream owing to their traditional medicinal importance and reported pharmacological activities. The plant is known to contain bioactive phytoconstituents such as flavonoids, tannins, alkaloids, glycosides, and phenolic compounds, which are associated with antioxidant, anti-inflammatory, antimicrobial, and wound-healing properties. These characteristics make the leaves of *Ficus religiosa* a promising natural ingredient for topical cosmetic applications.

Index Term: *Ficus religiosa*, Herbal face cream, Phytoconstituents, Flavonoids, Tannins, Antioxidant activity, Anti-inflammatory activity.

INTRODUCTION

The increasing interest in natural and plant-based cosmetic products has led to significant research into herbal formulations for skin care. In recent years, herbal face creams have emerged as an important category of cosmeceuticals because they combine cosmetic benefits with the therapeutic potential of medicinal plants. These formulations are often preferred over purely synthetic products due to their perceived safety, biocompatibility, affordability, and lower risk of irritation when properly prepared and evaluated. The development of a herbal face cream from medicinal plant extracts therefore represents a meaningful approach in modern pharmaceutical and cosmetic sciences.

Ficus religiosa L., commonly known as the sacred fig or Peepal tree, is a plant of considerable medicinal importance in traditional systems of medicine. It belongs to the family Moraceae and has long been used in ethnomedicine for its broad range of pharmacological activities. Various parts of the plant, especially the leaves, have been reported to contain biologically active phytoconstituents such as flavonoids, tannins, glycosides, and other secondary metabolites that contribute to antioxidant, anti-inflammatory, wound-healing, and antimicrobial properties. Because these properties are relevant to skin protection and repair, *Ficus religiosa* leaves present a promising natural source for topical cosmetic formulations.

The skin is continuously exposed to environmental stressors such as ultraviolet radiation, pollution, microorganisms, and oxidative damage, all of which can contribute to dryness, dullness, irritation, and premature aging. A face cream formulated with herbal ingredients may help address these concerns by providing moisturization, surface protection, and biologically active compounds capable of supporting skin health. In this context, the extract of *Ficus religiosa* leaves is of particular interest because its antioxidant and anti-inflammatory potential may help protect the skin from free radical damage and inflammatory reactions. Such activity supports its possible use in a dermatological or cosmetic preparation intended for regular facial application.

Formulation of a herbal face cream requires careful selection of ingredients and a suitable semisolid base that ensures stability, spreadability, ease of application, and compatibility with the skin. In addition to the incorporation of the plant extract, the product must be evaluated for physicochemical properties such as pH, viscosity, spreadability, appearance, and stability to determine its quality and acceptability. These evaluation parameters are essential because even a biologically active herbal preparation may be unsuitable for use if it is physically unstable, excessively greasy, poorly spreadable, or outside the skin-friendly pH range.

Plants have played a significant role in maintaining human health and improving the quality of human life for thousands of years and have served humans well as valuable components of medicines, seasonings, beverages, cosmetics and dyes. Herbal medicine is based on the premise that plants contain natural substances that can promote health and alleviate illness. In recent times, focus on plant research has increased all over the world and a large body of evidence has collected to show immense potential of medicinal plants used in various traditional systems. Today, we are witnessing a great deal of public interest in the use of herbal remedies. This review emphasizes the traditional use and clinical potentials of *Ficus religiosa*. Through which the authors hope to attract the attention of natural product researchers throughout world on the explored potential of *F. religiosa*.

The Demand of herbal cosmetics due to the availability of new ingredients the financial rewards for developing successful products and maintained of quality standard. Cosmetics are the products applying on the body. Face cream is used as cosmetic for softening and cleansing action. The Ayurvedic system of medicine was one of the most important systems that uses herbal plant and extract of the treatment of management of various Diseases state. The herbal face cream is specially designed for your face. It cleans deep down to the skin cleaning pores, removing all the impurities like dust, breakdown, sweat and even makeup previously applied to the skin. Herbal face cream is skin enhances complexion and leaving skin smooth and soft. cleanser can be used as a part of a skin care regimen together with a toner and moisturizer.

Aim & Objective

Aim

To develop and evaluate a herbal face cream using leaf extract of *Ficus religiosa* and to assess its suitability for cosmetic application based on standard evaluation parameters.

Objectives

- To collect and authenticate healthy leaves of *Ficus religiosa*.
- To prepare dried leaf powder and obtain plant extract using suitable solvent extraction method.
- To develop a stable herbal cream formulation incorporating the plant extract.
- To formulate a safe and effective herbal face cream using natural ingredients.
- To ensure proper emulsification of oil and aqueous phases for smooth consistency.
- To incorporate *Ficus religiosa* leaf extract without affecting stability of the formulation.
- To perform stability studies under different storage conditions.
- To check irritancy potential on skin (if applicable).
- To ensure microbial safety and product stability over time.
- To utilize the antioxidant, antimicrobial, and anti-inflammatory properties of *Ficus religiosa* in cosmetic formulation.
- To develop a natural alternative to synthetic face creams with minimal side effects.
- To enhance skin health by improving hydration, protection, and overall appearance.

BOTNICAL DISCRIPTION

Synonyms :-peepal tree, Bodhi tree

Biological source :- it is obtained from the fresh leaves of *ficusereligiosa* (peepal tree)

Family :-Moraceae.



Fig1 :-*ficusereligiosa* (peepal tree)

1. Taxonomical Classification

- Kingdom: Plantae
- Division: Angiosperms
- Class: Eudicots
- Order: Rosales
- Family: Moraceae
- Genus: *Ficus*
- Species: *Ficus religiosa*

2. Leaves

Leaves are the most distinctive feature

- Shape: heart-shaped (cordate) with a long tapering tip (drip tip)
- Arrangement: alternate
- Size: 7–17 cm long, 4–12 cm wide (approx.)
- Texture: thin, smooth, glabrous
- Venation: prominent reticulate venation
- Special feature: long “tail-like” apex helps in water drainage during rain

3. Leaves, Latex & Special Features

Contains milky latex in all plant parts

Known for:

- Long lifespan (can live for hundreds of years)
- High ecological importance (supports biodiversity)
- Considered a sacred tree in India and Buddhism

4. Economic and Medicinal Importance

- Used in traditional medicine (Ayurveda)
- Parts used: bark, leaves, seeds, latex

Reported activities:

1. Anti-inflammatory
2. Antidiabetic
3. Antimicrobial
4. Wound healing

Pharmacological Actions

Ficus religiosa is one of the most important medicinal plants used in traditional Ayurvedic medicine. Various parts of the plant, including leaves, bark, fruits, roots, and latex, possess therapeutic properties. The leaves are rich in bioactive phytoconstituents such as flavonoids, tannins, phenolic compounds, saponins, alkaloids, glycosides, terpenoids, and sterols. These compounds are responsible for numerous pharmacological activities that can be beneficial for skin health and cosmetic applications.

1. Antioxidant Activity

Oxidative stress is one of the major causes of premature skin aging. Free radicals generated by ultraviolet radiation, pollution, cigarette smoke, and environmental toxins damage cellular proteins, lipids, and DNA. This damage accelerates wrinkle formation, pigmentation, dryness, and loss of skin elasticity.

The leaves of *Ficus religiosa* contain abundant flavonoids and polyphenolic compounds that act as natural antioxidants. These compounds donate electrons to unstable free radicals and neutralize them before they can damage skin cells.

Benefits to Skin:

- * Protects skin cells from oxidative damage
- * Delays formation of wrinkles and fine lines
- * Maintains youthful appearance
- * Reduces dullness caused by environmental stress
- * Improves overall skin vitality

2. Anti-inflammatory Activity

Inflammation is commonly associated with acne, allergic reactions, dermatitis, insect bites, and irritated skin conditions. Inflammatory mediators such as prostaglandins, histamine, and cytokines cause redness, swelling, pain, and tissue damage. The phytochemicals present in *Ficus religiosa* have been reported to suppress inflammatory pathways and reduce the release of pro-inflammatory mediators.

Benefits to Skin:

- * Reduces redness and swelling
- * Soothes irritated skin
- * Relieves itching and burning sensation
- * Helps manage inflammatory skin disorders
- * Supports recovery of damaged skin tissues

3. Antimicrobial Activity

Human skin constantly encounters various microorganisms. Excessive growth of pathogenic bacteria and fungi can lead to acne, folliculitis, skin infections, and unpleasant skin conditions.

Studies have demonstrated that *Ficus religiosa* extracts exhibit antimicrobial activity against several Gram-positive and Gram-negative bacteria as well as fungal species.

Benefits to Skin:

- * Inhibits growth of acne-causing microorganisms
- * Reduces microbial contamination on skin surface
- * Prevents minor skin infections
- * Helps maintain healthy skin flora
- * Enhances effectiveness of herbal anti-acne formulations

4. Anti-acne Activity

Acne vulgaris is among the most common dermatological conditions, particularly in adolescents and young adults. It develops due to excessive sebum production, bacterial proliferation, inflammation, and blockage of hair follicles. Because *Ficus religiosa* possesses both antimicrobial and anti-inflammatory properties, it can act against multiple factors involved in acne development.

Benefits to Skin:

- * Reduces bacterial growth associated with acne
- * Decreases inflammatory lesions
- * Minimizes redness around pimples
- * Helps prevent formation of new acne lesions
- * Supports clearer and healthier skin

5. Wound-Healing Activity

The wound-healing process involves inflammation, collagen synthesis, angiogenesis, tissue regeneration, and epithelialization. Medicinal plants that promote these processes are valuable in skin-care preparations. Research indicates that *Ficus religiosa* accelerates wound contraction and tissue repair through stimulation of fibroblast activity and collagen deposition.

Benefits to Skin:

- * Accelerates healing of cuts and abrasions
- * Promotes tissue regeneration
- * Supports formation of new skin cells
- * Reduces healing time
- * Improves restoration of normal skin structure

6. Moisturizing and Skin Conditioning Effect

Although the plant itself is not a classical humectant, its phytoconstituents can contribute to maintenance of skin hydration when incorporated into creams and emulsions. The extract supports skin conditioning by protecting the epidermis and reducing transepidermal water loss.

Benefits to Skin:

- * Enhances softness and smoothness
- * Improves skin texture
- * Maintains hydration balance
- * Reduces roughness and dryness
- * Promotes healthy-looking skin

7. Skin Protective Activity

Environmental factors such as ultraviolet radiation, pollution, dust, and chemical irritants continuously challenge skin health. Antioxidant and anti-inflammatory compounds present in *Ficus religiosa* provide protective effects against these external stressors.

Benefits to Skin:

- * Strengthens skin defense mechanisms
- * Reduces environmental damage
- * Supports epidermal barrier function
- * Protects cellular integrity
- * Enhances skin resilience

Overall Significance in Herbal Face Cream Formulation

The incorporation of *Ficus religiosa* leaf extract into herbal face creams provides a multifunctional approach to skin care. The extract not only offers cosmetic benefits such as improved texture, brightness, and hydration but also provides pharmacological effects including antimicrobial protection, anti-inflammatory action, antioxidant defense, wound healing, anti-acne activity, and anti-aging properties. These combined actions make *Ficus religiosa* a highly promising natural ingredient for modern herbal cosmetic formulations.

Summary of Skin Benefits

- ✓ Antioxidant activity
- ✓ Anti-inflammatory activity
- ✓ Antimicrobial activity
- ✓ Anti-acne activity
- ✓ Wound-healing activity
- ✓ Astringent activity
- ✓ Moisturizing effect

- ✓ Skin-conditioning effect

MATERIALS AND METHODS

Materials & apparatus

- 1) Fresh leaves of *Ficus religiosa*
- 2) Methanol (analytical grade) or ethanol (safer alternative for cosmetic preparations)
- 3) Stearic acid
- 4) Cetyl alcohol
- 5) Liquid paraffin
- 6) glycerin
- 7) Distilled water
- 8) Methyl paraben
- 9) Propyl paraben

1. Collection of Plant Materials and Chemicals

The main raw material used in this study was fresh leaves of *Ficus religiosa* (Peepal tree). The leaves were collected from a healthy and authenticated plant source and washed thoroughly to remove dust and other impurities. After collection, the leaves were shade-dried to preserve their phytoconstituents and then pulverized into coarse powder. The powdered material was stored in an airtight container until extraction.

The excipients used for the preparation of the face cream included a cream base-forming agent such as stearic acid, cetyl alcohol, liquid paraffin, glycerin, triethanolamine, methyl paraben, propyl paraben, purified water, and fragrance. These ingredients were selected to provide suitable consistency, stability, moisturizing effect, preservation, and pleasant sensory characteristics. The selection of excipients may vary slightly depending on the formulation design, but the basic purpose remains to obtain a smooth, stable, and skin-compatible herbal cream.

a. Collection and authentication of plant material

Fresh leaves of *Ficus religiosa* were collected from a reliable natural source. The plant material was authenticated by a botanist or through a recognized botanical department to confirm its identity. Authentication is an essential step in herbal research to ensure reproducibility and accuracy of the study. After authentication, the leaves were cleaned, dried under shade, and stored properly for further processing.

a. Preparation of leaf extract

The dried leaves were powdered using a grinder and subjected to extraction using a suitable solvent such as ethanol, methanol, or water depending on the study design. In most herbal cosmetic studies, alcoholic extraction is preferred because it efficiently extracts both polar and moderately non-polar phytoconstituents. The powdered leaves were packed in a Soxhlet apparatus or macerated in solvent for a fixed period to obtain the crude extract. After extraction, the solvent was removed under reduced pressure or by evaporation to yield a concentrated extract. The obtained extract was then stored in a closed container away from light and moisture until use.

b. Formulation of herbal face cream

The herbal face cream was prepared by the emulsion or cream method, usually as an oil-in-water type cream because it is non-greasy, easy to wash off, and suitable for facial application. The oil phase generally consisted of stearic acid, cetyl alcohol, and liquid paraffin, while the aqueous phase consisted of purified water, glycerin, and preservatives. The oil phase and aqueous phase were heated separately to the same temperature, usually around 70 to 75 degrees Celsius, and then mixed with continuous stirring until a uniform emulsion was formed. After the mixture cooled to a lower temperature, the *Ficus religiosa* leaf extract was incorporated slowly with constant stirring to ensure

even distribution throughout the cream base. A small quantity of fragrance could be added at the end to improve acceptability.

d. Preparation procedure

The procedure may be described in sequential steps as follows:

1. The required quantity of oil phase ingredients was weighed and heated until completely melted.
2. The aqueous phase ingredients were separately dissolved in purified water and heated to the same temperature.
3. The aqueous phase was added gradually to the oil phase with constant stirring to form a homogenous cream base.
4. The Ficus religiosa extract was incorporated into the base after cooling slightly.
5. The final formulation was mixed until a smooth, uniform, and semisolid cream was obtained.
6. The prepared cream was transferred into a clean container and stored for evaluation.

Fresh leaves of Ficus religiosa were collected from a local garden area of amgaon, these leaves are get collected, and shade dried for prevention of biological properties of ficus religiosa leaves which are used in formulation studies.

Immediately after collection, all plant materials were carefully washed with running tap water followed by distilled water to remove dust and foreign particles. The cleaned plant materials were then shade-dried at room temperature until a constant weight was achieved. After complete drying, the materials were crushed using a mechanical grinder to obtain a coarse powder. The powdered samples were stored in airtight containers and kept in a dry place for further experimental use.

2. Preparation of Plant Extracts

❖ Preparation of Ficus religiosa Leaf Extract

Twenty grams (20 g) of dried leaf powder of Ficus religiosa was accurately weighed and transferred into a conical flask containing 200 ml of methanol. The mixture was subjected to extraction by heating at 60°C for 60 minutes with occasional stirring to ensure proper mixing and efficient extraction of phytoconstituents. After completion of extraction, the mixture was allowed to cool and then filtered through Whatman No. 1 filter paper. The obtained filtrate was collected and concentrated by evaporation under controlled conditions to remove the solvent. The resulting semisolid extract was stored in a properly labeled container for further use in formulation studies.

Table2 :- formulation of herbal cream

Formulation code	Peeple tree leaves (gm)	Cream Base q.s. (ml)
F1	2 gm	20 ml
F2	3gm	20 ml
F3	5gm	20 ml

EVALUATION TESTS & PARAMETERS

1. Organoleptic evaluation

Organoleptic evaluation refers to the visual and sensory examination of the cream. The formulation is observed for its color, odor, appearance, texture, and consistency. A good herbal face cream should have a pleasant or acceptable smell, smooth texture, uniform appearance, and no signs of phase separation or grittiness. This test is important because it reflects the cosmetic acceptability of the product.

Table 3:- parameter & observation

Sr.no	Parameter	observation
1	Color	Light green
2	Odour	Characteristic
3	Appearance	Smooth, elegant
4	Texture	Soft, non-grity
5	consistency	Semi – solid & uniform

2. Physical appearance

The physical appearance of the cream is checked by visual inspection. The cream should appear elegant, homogeneous, smooth, and free from lumps. The presence of any visible particles, cracking, or separation indicates poor formulation or instability. Physical appearance is one of the first and most important quality indicators for a face cream.



Fig2 :- Physical appearance

3. Homogeneity test

Homogeneity is determined by rubbing a small amount of cream between the fingers or by spreading it on a clean glass slide. The cream should spread uniformly without forming lumps or uneven patches. A homogeneous formulation ensures that the herbal extract is properly dispersed throughout the base and that each dose applied to the skin is consistent.

4. pH determination

The pH of the cream is measured using a calibrated pH meter after dispersing the formulation in distilled water. Since facial skin has a slightly acidic pH, the cream should ideally fall within a skin-friendly range to minimize irritation and maintain the natural protective acid mantle of the skin. pH is a critical parameter because an unsuitable pH may cause dryness, redness, or discomfort on repeated application.



Fig3 :- pH determination

5. Spreadability test

Spreadability measures how easily the cream can be distributed over the skin surface. It is usually evaluated by placing the cream between two glass slides and measuring the time required for the upper slide to move under a specific weight. Good spreadability means the cream can be applied easily with minimal effort and will cover the skin evenly. This is especially important for face creams because users prefer products that spread smoothly and absorb well.

6. Viscosity measurement

Viscosity indicates the thickness and flow behavior of the cream. It is generally measured using a viscometer or similar instrument. A proper viscosity level is essential for a cream because it must be thick enough to remain stable in the container but soft enough to be applied easily on the skin. If the viscosity is too low, the cream may become runny; if too high, it may be difficult to spread.

7. Washability test

Washability determines how easily the cream can be removed from the skin using water. A good face cream should not leave excessive residue or a greasy film after washing. This test is important because users usually prefer a formulation that is comfortable, non-sticky, and easy to clean off after use.

8. Stability studies

Stability studies are performed to observe whether the cream remains unchanged under different storage conditions. The formulation is kept at various temperatures and humidity conditions for a specific period, and it is checked for changes in color, odor, pH, consistency, and phase separation. Stability testing helps determine the shelf life and storage suitability of the herbal face cream. A stable product should retain its original properties throughout the study period.

9. Phase separation test

Phase separation is checked during storage to ensure that the oil and water phases of the cream do not separate. Any visible separation indicates poor emulsion stability. A well-formulated herbal cream should remain uniform and stable without breaking during storage.

10. Skin irritation test

If included in the study, a patch test or irritation test may be performed on a small area of skin to assess safety. The cream is applied in a limited quantity and observed for redness, swelling, itching, or burning sensation. The absence of irritation suggests that the formulation is suitable for topical use. This test is especially important for herbal cosmetics intended for facial application.

11. Microscopic or particle dispersion study

In some projects, the cream may be examined under a microscope to check the uniform distribution of herbal extract particles. This helps confirm that the active ingredient is properly incorporated into the

base and that the texture is smooth. Uniform particle distribution also contributes to better appearance and performance.

12. Rub test

The rub test is carried out by applying the cream on the skin and noting its feel during rubbing. The formulation should feel smooth, non-gritty, and non-irritating. This test gives a practical idea of how the cream behaves during application and whether it has a pleasant sensory profile

Table4 :- Parameter purpose

Sr.no	Parameters	Purpose
1	Color & odour	To assess sensory acceptability
2	Appearance	To check smoothness and elegance
3	Homogeneity	To ensure uniform distribution of ingredient
4	pH	To confirm skin compatibility
5	Spreadability	To determine ease of application
6	Viscosity	To evaluate consistency and flow
7	Washability	To check ease of removal
8	Stability	To assess storage performance
9	Phase separation	To confirm emulsion stability
10	Skin irritation	To verify topical safety

Conclusion

The present study entitled “Development and Evaluation of Herbal Face Cream from Leaves of *Ficus religiosa*” was undertaken with the objective of formulating a safe, effective, and stable herbal cosmetic preparation using the medicinal properties of *Ficus religiosa* leaves. Herbal cosmetics have gained significant popularity in recent years due to the increasing awareness regarding the adverse effects associated with synthetic chemicals and the growing preference for natural products. In this context, *Ficus religiosa*, commonly known as the Peepal tree, was selected because of its well-documented antioxidant, antimicrobial, anti-inflammatory, and skin-protective properties.

The present study successfully demonstrated the development and evaluation of a herbal face cream using leaf extract of *Ficus religiosa*. The formulated cream showed good stability, smooth texture, acceptable pH, good spreadability, and no signs of irritation, making it suitable for topical application. The presence of phytoconstituents such as flavonoids, tannins, and phenolic compounds may provide antioxidant, antimicrobial, and skin-protective effects. Therefore, *Ficus religiosa* leaf extract can be considered a promising natural ingredient for safe and effective herbal skincare formulations.

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